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ABSTRACT

The purpose of this study was to provide statistical evidence to demonstrate that peer collaboration on math homework increases academic performance in math. This study examined the benefits of peer collaboration on two unit tests on multiplication. It compared the results of students who worked collaboratively on homework and those who did not. The null hypotheses in the study stated that there was no significant differences in performance between children who work collaboratively in small groups and those who work individually at the .05 level of significance. The entire study took six weeks. The subjects of this study included eighteen eight and nine year old third graders. The class included one child with a learning disability and five talented and gifted students showing various levels of intelligence in the class. Seventeen of these students were recommended from past teachers to learn at third-grade level mathematics and one student was recommended at a second grade level. The control group for this research project consisted of children who worked on their math homework alone. The experimental group consisted of children who worked in collaborative groups of three or four students. The researcher used a paired sample t-test, since all students experienced the experimental factor and control factor, to evaluate the unit test scores of students who worked collaboratively and those who did not. This test was given at the end of each chapter on multiplication. The researcher used the Scott-Foresman-Addison Wesley Assessment Sourcebook for the tests. Based on these results from six weeks of testing and study, the researcher retains the hypothesis there was no significant difference in academic success between students who worked collaboratively and those who did not. The results from this research were beneficial to the ongoing research of peer collaboration in the classroom. Peer collaboration can be effective when used to as one teaching tool instead of the only teaching tool. While peer collaboration is useful to some students, it is not for all students. Therefore, peer collaboration did not show significance at the .05 level in this study. (Contains 31 references.) (Author/YDS)

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ED 469 634

THE RELATIONSHIP OF PEER COLLABORATION ON THIRD GRADE STUDENT MATH PERFORMANCE

An Action Research Project

Presented to the

Department of Teacher Education

of Johnson Bible College

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In Partial Fulfillment

of the Requirement for the Degree

Master of Arts in

Holistic Education

by

Brandi Colleen Percifield Wilgus

July 2002

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The purpose of this study was to provide statistical evidence to demonstrate that peer collaboration on math homework increases academic performance in math. This study examined the benefits of peer collaboration on two unit tests on multiplication. It compared the results of students who worked collaboratively on homework and those who did not. The null hypothesis in the study stated that there was no significant difference in performance between children who work collaboratively in small groups and those who work individually at the .05 level of significance. The entire study took six weeks.

The subjects of this study included eighteen eight and nine year old third graders. The class included one child with a learning disability and five Talented and Gifted students showing various levels of intelligence in the class. Seventeen of these students were recommended from past teachers to learn at third-grade level mathematics and one student was recommended at a second grade level.

The control group for this research project consisted of children who worked on their math homework alone. The experimental group consisted of children who worked in collaborative groups of three or four students. The researcher used a paired sample t-test, since all students experienced the experimental factor and control factor, to evaluate the unit test scores of students who worked collaboratively and those who did not. This test was given at the end of each chapter on multiplication. The researcher used the Scott-Foresman-Addison Wesley Assessment Sourcebook for the tests.

Based on these results from six weeks of testing and study, the researcher retains the hypothesis there was no significant difference in academic success between students who worked collaboratively and those who did not. The results from this research were beneficial to the ongoing research of peer collaboration in the classroom. Peer collaboration can be effective when used as one teaching tool instead of the only teaching tool. While peer collaboration is useful to some students, it is not for all students. Therefore, peer collaboration did not show significance at the .05 level in this study.

APPROVAL PAGE

This Action Research Project by Brandi Colleen Percifield is accepted in its present form by the Department of Teacher Education at Johnson Bible College as satisfying the action research project requirements for the degree Master of Arts in Holistic Education.

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Chapter 1

INTRODUCTION

Significance of the Problem

Peer collaboration has been a topic of interest for many years, and still is continuously debated. Many teachers believe frontal teaching, or lecture, easier and less time consuming, but frontal teaching does not present the best method of learning for students with an external thinking style (Sternberg, p. 70).

Many teachers worry about using peer collaboration because not enough time exists during the day. Teachers under strict timelines for math feel pressured to move according to schedule. This approach limits opportunity for those students who do not perform well in mathematics. Research, as demonstrated in the literature review, has shown peer collaboration beneficial to most students, increasing understanding in other areas of academics.

The purpose of this study was to examine the effects of peer collaboration on academic performance in mathematics. It is possible the effects of group work required the same amount of time and benefited most students academically.

Statement of the Problem

The present study examined whether or not students who completed math homework in small groups achieved math test scores higher than those students who worked alone.

Definition of Terms

For the purpose of this study, the following definitions have been adopted:

Small Group was defined as three or four students working collaboratively.

Peer Collaboration was defined as students working together to complete a common goal (homework).

Homework was defined as the daily assignments given students to complete.

Unit Test was defined as a number of problems reflecting material taught during a three-week multiplication unit.

Frontal Teaching was defined as the teacher lecturing in front of the class.

Academic Performance was defined as the scores from tests.

External Thinking Style was defined as students who tend to be more extroverted, people-oriented, outgoing, socially sensitive, and interpersonally more aware.

Limitations

The researcher worked with a small sample size in one classroom of one school.

The researcher was unable to choose students at the same ability level in mathematics.

The researcher performed the experiment in a relatively short amount of time (six weeks).

The researcher realized students did not equally participate in peer collaboration by observation during peer collaboration time.

The researcher was unable to control equal numbers of participants in each group due to the total number of students in the class.

The researcher was unable to randomly choose the sample for the study.

The researcher did not assume the sample was a fair representation of third grade elementary students in eastern Tennessee.

The researcher assumed that absences effected test scores.

Assumptions

The researcher assumed that all children had equal opportunity to learn.

The researcher assumed some students differ in mathematical intelligence.

Hypothesis

There is no significant difference in academic performance between children who work collaboratively in small groups and those who work individually at the .05 level of significance.

Chapter 2

REVIEW OF RELATED LITERATURE

Literature Review

Peer collaboration has been a hot issue for many years and continues today. According to Berk and Winsler, "Vygotsky suggested that what we should be measuring is not what children can do by themselves or already know but rather what they can do with the help of another person and have the potential to learn" (p. 26). Vygotsky continues in his own book with the idea that when you give two children at the mental age of eight a problem too difficult for their mental age, they cannot do it. But "we discovered that one child could, in co-operation, solve problems designed for twelve-year-olds, while the other could not go beyond problems intended for nine-year-olds" (p. 103). This leads the researcher to believe students operate on higher-level thinking skills when working collaboratively.

There are different ways to combine this individual and group learning. One way is to assign each group member a separate section and put together a collaborative whole. Another is to assign each member part of the whole, and they teach the others in the group. The final way is to work cooperatively and test individually (Johnson & Johnson, p. 19).

There are many different aspects to consider when thinking about peer collaboration. Thayer-Bacon and Pack-Brown define collaboration as

> the intellectual and emotional interaction that takes place between diverse people who are in a changing relation with each other and are able to mutually communicate through an accurate and shared verbal and nonverbal language; therefore, they are potentially able to influence each other (p. 51).

It is important to remember that peer collaboration differs from peer tutoring in that peer collaboration assumes equal abilities of group members.

One student said "it's easier to learn, than to be alone and not to know what to do" (Jacob, p. 56). Jacob also states the most important benefits of cooperative learning: "it builds self-esteem, citizenship skills and caring for other people." "It also helps achievement, critical thinking, attitudes toward school and subject matter, and liking for classmates" (p. 28). Although not all of the studies described in this research review involved third-grade children, many aspects of peer collaboration are applicable.

There are many factors dealt with in collaborative learning. Some of them are worldview, gender, higher-order thinking skills, self-efficacy and self-esteem, race, and social skills. These and other factors are dealt with more in depth in the following sections.

Worldview

Worldview becomes a factor when collaboration occurs because all people come from different backgrounds and experiences. These experiences impact "the collaborative relationship, process, and outcome" (Pack-Brown & Thayer-Bacon p. 45). Davidson and Worsham state more clearly "When individuals are presented with a problem or decision, they have an initial conclusion based on categorizing and organizing incomplete information, their limited experiences, and their specific perspective"

(p. 128).

People do not often value the same ideas, goals, or desires. However, cooperative learning tends to suggest more realistic views of others, not using stereotype all the time. This allows for enlarging one's worldview (Johnson & Johnson, p. 39). Berk and Winsler use the thoughts of Piaget to conclude "through arguments and disagreements with agemates, children are repeatedly jarred into noticing that others hold viewpoints different from their own" (p. 18).

While peer collaboration enlarges one's worldview, some believe trust is not vital to completing the task. Pack-Brown and Thayer-Bacon argue that collaboration does not require willingness to collaborate or trust of other people in the group (p. 48-49), Johnson and Johnson disagree. "In order for peer relationships to be constructive influences, they must promote feelings of belonging, acceptance, support, and caring rather than feelings of hostility and rejection" (p. 28). They also contend trust is necessary for stability in cooperation and effective communication. The more honesty and trust in a group, the higher the stability of that group (Johnson & Johnson, p. 114). Collaboration must have good communication and sharing of ideas.

Johnson and Johnson believe that one needs to learn to view other perspectives, "one of the most critical competencies for cognitive and social development," through interacting with peers (p. 25). Davidson and Worsham agree claiming student's perspectives are broadened by other's viewpoints. Students see how others think, feel, their talents and dreams (p. 261).

Webb contends that the perceptions of the group members about the task being performed as well as prior education, and variance in group work prior can contribute to the variations of successful group work (Fall, Troper, & Webb, p. 407-408). Many researchers shown here believe worldview plays a significant part in peer collaboration.

Self-Efficacy/Self-Esteem

"Greater achievement is typically found in collaborative situations where peers work together than in situations where individuals work alone." When a child is unmotivated or does not study well, cooperative interaction with peers has good effects on productivity (Johnson & Johnson, p. 27).

Increasing self-efficacy, "the expectation of successfully obtaining valued outcomes through personal effort," is one of the aims of group processing. In other words, working in small groups increases a group member's productivity because the member is encouraged in accomplishing the task with the empowerment of their group members (Johnson & Johnson, p. 146). Kagan et al. adds that cooperative learning creates positive effects on self-esteem because students feel more liked by classmates and feel more successful academically (p. 12).

Davidson and Worsham believe "diffusion of responsibility is another role cooperative learning plays in establishing a positive mental climate" and that "diffusion of responsibility ... can have a positive effect on student's sense of self-efficacy" (p. 12).

However, collaboration does not always produce increased self-efficacy or self-esteem. Jacob declares from data of fourth grade math classes that the "Analyses of the

quantitative data indicate that measures of self-esteem and attitudes toward school showed no differences between the three fourth-grade mathematics classes" (p. 57).

Size of Group

Johnson and Johnson studied collaboration and group sizes. As the number in the group increases, so do the range of skills and abilities (p. 47). Many people would see this range of skills as a good thing until one considers that the larger the group, the harder the group members must work at letting everyone speak, reaching consensus, and keeping all members on task. The practical solution is to allow time and material to be learned or resources needed to dictate the size of the group (Johnson & Johnson, p. 47). Most groups consist of four to six members (Kagan et al., p. 6).

Higher-Order Thinking and Reasoning

Many believe that small group work increases higher-order thinking skills and a higher ability to reason. Berk and Winsler state "all uniquely human, higher forms of mental activity are derived from social and cultural contexts because these mental processes are adaptive" (p. 12). They later claim peer interaction stimulates cognitive development when children merge perspectives and truly cooperate in problem solving while working toward a common goal (Berk & Winsler, p. 132).

Luther presents the viewpoint of balance between frontal teaching and peer collaboration. Peer collaboration allows students to actively engage in learning by explaining their understanding of the problem and their method to solve it. The explanation to others increases higher-order thinking skills. Developing higher-order thinking by actively engaging in collaborative learning dates back to Aristotle, Plato, and

Descartes (Luther, p. 60-63). Following Luther, Davidson and Worsham affirm the idea that "When individuals present their conclusion and its rationale to others, they engage in cognitive rehearsal, deepen their understanding of their position, and discover higher level reasoning strategies" (p. 128). Davidson and Worsham also claim that students higher level reasoning can be fostered by observing and commenting on other students mental habits (pl. 24).

Samaha and De Lisi also agree that "children who engaged in an active debate were more likely to improve their moral reasoning than those who were described as passive listeners" (p.7). Students are more likely to make more accurate judgments when discussed in collaboration. Piaget contends as a child gains realization of self, the child is in opposition to others and tries to win the others' affections (Inhelder & Piaget, p. 115). When discussions occur, it is said that the members of the group must defend their position to the group, making themselves more aware of their stance on the matter. Davidson and Worsham agree, articulating that as children discuss in groups, diversity of response necessitates explanation and justification, quite naturally extending and refining their knowledge (p. 19). As children discuss, each child brings an explanation with their background, enabling different points of view to expand others ideas on the subject.

Berk and Winsler, discussing children talking about mathematics while working with others, decided "the process enables children to grasp the meaning and usefulness of mathematical practices and to develop the view that mathematics is a community endeavor, not an adult-imposed system or a private problem-solving activity" (p. 123-124).

Gender

Jacob states "Gender, ethnic, and peer cultures may influence students' approach to cooperative learning" (p. 162). According to many studies, one by Mulryan, small groups of mixed gender or all males performed better than all females. It is believed that the females discuss more socially and do not offer their own opinions to be respectful of the other group member's feelings (p. 298-299). Kagan et al. supports this conclusion by citing experimental data where the boys worked significantly longer than the girls, stating "that girls *can* compete as much as boys and *do* compete equally if explicitly asked to do so" (p. 58), and that girls were not as aggressively self-oriented as the boys which follows the more overt and frequent aggression found in boys (Kagan et al., p. 59).

Race

Race blends into other areas, but Kagan et al. gave special attention to race in collaborative learning. There is a tendency for minority students to gain, especially in achievement as a result of cooperative learning. It is believed that if students are working towards a common goal on a regular basis, they will learn to like and respect one another. Further, "Allport's theory holds that if individuals of different races are to develop supportive relationships, they must engage in frequent cooperative activity on an equal footing" (p. 10).

Ability Levels

Various studies reported the conclusions that peer collaboration is often beneficial to the low and high achiever, but ineffective for the students in the middle when a group consists of all three levels. Students in the middle perform better when working with

either low or high achievers. Kagan et al., however, generally recommends placing high, medium, and low ability students in the same learning group (p. 11). Johnson and Johnson agree:

> More elaborative thinking, more frequent giving and receiving of explanations, and greater perspective taking in discussing material seem to occur in heterogeneous groups, all of which increase the depth of understanding, the quality of reasoning and the accuracy of long-term retention (p. 49).

Berk and Winsler also agree that "children's problem solving seems to improve most when their partner is an "expert"- a person especially capable at the task- who can provide new ways of approaching the situation not already within the child's repertoire" (p. 20).

There are concerns that the high-achiever will not be challenged, will be slowed down, or do all the work. Research, according to Johnson and Johnson, shows no loss, but often high-achievers perform better in groups than alone, especially when looking at retention and strategy instead of just correct answers (p. 169). Peer collaboration can help high-achievers have a more positive attitude about learning, become more motivated, and feel better about themselves. They are also seen as resources to their peers instead of competitors. This allows high-achievers to perfect collaborative skills (Johnson & Johnson, p. 170). Kagan et al. adds that high-achievers are usually better off working with low and medium ability students rather than other high achievers, but at times when no academic improvement is made, high-achievers retain their ability level (p. 118).

Low achievers can benefit from peer collaboration by increasing achievement. "There can be little doubt that the low and medium-ability students especially, benefit from working collaboratively with peers from the full range of ability differences" (Kagan et al., p. 118). Generally, low-achievers work better if they are taught collaborative skills before group work begins and if their responsibility is assigned. Collaborative learning becomes less intimidating (Johnson & Johnson, p. 171).

Social Aspects

Many researchers contend that peer collaboration can improve student relations among different races, improve achievement, and overall improve personal relationships. Luther interjects that students who use collaborative learning improve on learning working with others, developing respect and friendship among majority and minority students, and helping depressed and apathetic students (p. 61). Johnson and Johnson add cooperative learning helps students to learn attitudes, value skills, and things not learned from adults. Students do this through imitation of one another's behavior and admired competencies, shaping social behaviors, attitudes, and perspectives (p. 25).

According to Johnson and Johnson, schools focus on a lecture style of teaching and individual student scores instead of focusing on each child's learning. Students who interact with one another are viewed disruptive to the system. They argue students are not trained well by educators in basic social skills with peers, but "peer relationships are a critical element in the development and socialization of children and adolescents" (p. 24). According to Davidson and Worsham, students acquire the social skills of listening, sharing data, asking questions, inviting someone to join a group, accepting an invitation

to join a group, paraphrasing, probing, and applying appropriate body language in collaborative learning (p. 104).

Another social issue comes from peer collaboration with friends. Zajac and Hartup found that students work well with their friends because they know each other and are not worried about offending another's point of view (p. 5-7). They were not against forming groups of students who did not know each other very well, but presented evidence for both cases. Johnson and Johnson disagree saying students who choose their own groups are often not very successful because of homogeneity in ability, race, and gender. These self-selected groups are often not on task as often as teacher-selected groups (p.49).

Special Needs Children

> All of the methods involve having the teacher assign the students to four-to-six member learning groups composed of high-, average-, and low-achieving students, boys and girls, black, Anglo, and Hispanic students, and mainstreamed academically handicapped students as well as their nonhandicapped classmates. In other words, each group is a microcosm of the class in academic achievement level, sex, and ethnicity (Kagan et al., p. 6).

Frequently, special needs children are not thought of as part of the "microcosm" of the classroom. Kagan et al. discovered that, in general, handicapped students are better both academically and socially when placed heterogeneously (p. 179).

Berk and Winsler have found that the higher mental functions root in social interaction and collaboration. Children have more problems when a disability gets in the way of positive interaction with peers. "This lack of full participation in social activities limits the development of higher mental functions" (p. 83).

Berk and Winsler have also quoted Vygotsky who "assumed that the same general laws and processes of development that apply in normal development also apply to children with special deficits or disabilities" (p. 83-84). Kagan et al. also affirms that the difference between mainstreamed handicapped students and others could overcome substantial differences by cooperation and improve relationships (p. 12).

Conclusion

Davidson and Worsham summarize the issues in research on peer collaboration.

> Research has shown positive effects of cooperative learning in the following areas: academic achievement, development of higher order thinking, self-esteem and self-confidence as a learner, intergroup relations including cross-race friendships, social acceptance of mainstreamed students, development of social skills, and ability to take the perspective of another person (p. xiv).

Chapter 3

METHODS AND PROCEDURES

The Students

The students involved in this study began with twenty-three students, but only eighteen scores were included in the data processed due to children moving or not obtaining parental permission. The students included were third graders, eight and nine year olds, coming primarily from middle-class homes. The participants included nine females and nine males. The class included one child with a learning disability, and five Talented and Gifted students showing various levels of intelligence among the participants. Nine participants live in single parent homes. Only one participant was an only child. According to recommendations from past teachers, seventeen of the participants were on a third-grade level in mathematics and one on a second grade level. However, only sixteen students scored above the fiftieth percentile on the Terra Nova test the previous year. The Terra Nova is used as the Tennessee state achievement test.

Timeline

This study began in December 2001 and continued for six weeks, ending in the beginning of February 2002.

Testing

The tests used came from the Scott Foresman - AddisonWesley Assessment Sourcebook. Based on the third grade schedule for math, the researcher taught chapters five and six on multiplication. Each chapter took approximately three weeks. Each test

was given two days after the completion of the unit to allow for a review day. The control and experimental groups tested on the same days. After the completion of chapter five, the control group became the experimental group.

Design of the Study

The class was randomly divided in half with two groups: A and B. Both groups experienced the experimental factor and control factor. In this six weeks study the experiment looked like Figure 1.

	First three weeks	Second three weeks
Control Factor (working on Homework individually)	Group A	Group B
Experimental Factor (working on homework collaboratively in small groups)	Group B	Group A

FIGURE 1

Study Design

Experimental Factor and Control of the Experimental Factor

The varying factor was allowance of peer collaboration on class work. The class was randomly placed in one of two groups using a random table of numbers. Group A was the control group working on homework alone. Group B was the experimental group working on homework collaboratively with peers in small groups of three or four for twenty minutes.

Class began with frontal teaching, giving the same lesson to both the control and experimental groups. A daily assignment was given. The control group worked independently and the experimental group worked collaboratively on the assignment.

At the end of the chapter, a review day was held and then a post-test given. The post-test scores were used in the researcher's data.

At the end of the first three weeks, Group A became the experimental group and Group B became the control group (see chart in Design of Study).

Analysis

The raw scores from the post-test were tabulated by the researcher and a mean score was calculated. A paired sample t-test was used to determine any significant difference between the control and experimental groups test scores. Some testing actually showed lower scores.

Chapter IV

RESULTS

The researcher analyzed all of the statistical data in this chapter using the SPSS software program. Data from the two chapter tests was recorded into SPSS and then a paired sample t-test was run. This test was used to compare the test results from the control and experimental groups. The control group consisted of students who worked alone on their homework for three weeks, while the experimental group worked on homework in collaborative groups of three or four students.

Table One shows the results from the tests for chapters five and six over multiplication. Results from Table One show there is no significant difference in test scores between students who complete homework alone and those who complete homework working collaboratively with other students. Equal variances were assumed for the three weeks of study for this chapter, and the results were not significant at the 0.05 level of significance. Therefore, the researcher accepts the hypothesis that there is no significant difference in academic performance between children who work collaboratively in small groups and those who work individually at the .05 level of significance.

TABLE 1

Comparison of Test Scores for

Control and Experimental Groups

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2 tail
Control (Traditional)	18	36.168				
			0	1.584	0	1.000*
Treatment (Groups)	18	36.167				

*Not Significant

Based on these results from six weeks of collaborative learning, testing, and study, the researcher retains the hypothesis that there is no significant difference in academic success between students who work on math homework alone and those who work collaboratively with peers.

Chapter V

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

Summary

This study consisted of the effects of peer collaboration on the unit test scores of eighteen third graders. The study began with twenty-three, but not all students who began the study were able to finish due to moving or not having parental permission, so their scores were deleted. The study was conducted over a six-week period, including two grading periods and two math units on multiplication. The experimental factor considered in this action research project was peer collaboration on math assignments. The control group consisted of students who worked on math assignments alone. The experimental group consisted of students who worked on math assignments in peer collaboration groups of three or four students. Results showed that peer collaboration had little effect on the overall academic success of the students. The results showed no significant difference. The researcher can conclude from the data gathered and the analysis of the statistics that peer collaboration was not a significant factor at the third grade level for academic achievement.

Conclusions

The results collected from this study suggest that peer collaboration, as well as many other teaching approaches, is a limited tool in the classroom. The class mean scores were not significant due to peer collaboration, but some individual test scores did improve. Despite statistical results, the researcher observed the children responding

positively to the group work. For this reason, the researcher believes peer collaboration is a useful took in the classroom, but should not be the only tool used. Teachers should vary their methods of teaching to include other thinking and learning styles, because over the years, it has been found that students learn in ways other than frontal teaching (Sternberg). Some children need the social interaction of peer collaboration to learn more effectively, while it inhibits others who learn in a different way.

One could ask should teachers use peer collaboration as a way of instruction or as a tool to build upon the knowledge presented by frontal teaching from the teacher beforehand? Peer collaboration presents a way for students to hear the material again in a different way. There are also students who are not influenced by peer collaboration one way or another. This could be due to mathematical intelligence, parental help, or simply personal motivation to obtain good grades.

The results from this statistical analysis demonstrated no significance between the experimental group and control group. While I believe that peer collaboration had no significance for the entire class, several factors could have contributed to this lack of significance. First, the sample size for this study was very small. Also, a limited amount of time to finish the assignment in the peer collaboration groups could have had a significant bearing on the results. Twenty minutes may not always be sufficient because students work at different rates of speed, and homework difficulty varies from basic memorization facts to problem solving. Finally, the study was only six weeks long. This short amount of time may have had an effect on the significance of the study.

Recommendations

Teachers should use this study as one idea to use peer collaboration in the classroom. Teachers could also use this study to find references for further study on peer collaboration. Peer collaboration did not in general increase scores on unit tests. Some testing actually showed lower scores. Elementary teachers should use peer collaboration effectively in the classroom to help those who learn better from this social interaction method

If this study were to be expanded upon, several new factors should be examined. First of all, peer collaboration should be considered in other subjects besides math. Math was where the researcher began as the beginning to a three-part question: which has the most benefit in math class, peer collaboration, writing, or manipulatives? However, since the results showed limited improvement on test scores, peer collaboration should be used in other research to determine the effects in other subjects. Those who choose to replicate this study should also find which students have specific intelligences in math. These students should be evenly distributed into peer collaboration groups. Time is another issue. Twenty minutes is not always a sufficient amount of time for students to complete assignments in their groups. Accommodation of time was the reason for the choice of twenty minutes. Use amounts of time that are beneficial to the students. Finally, a learning styles inventory should be given and referred to in order to determine how students learn best. Some students will increase academically with peer collaboration, while óthers will be penalized academically because they are uncomfortable.

The results of this study are beneficial to the ongoing research of peer collaboration in the classroom. Peer collaboration in this study was at best a limited tool aiding some students academically on their unit test scores. Future research should expand the scope of peer collaboration to include personal learning styles as well as academic success.

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APPENDICES

APPENDIX A

KNOX COUNTY SCHOOLS
ANDREW JOHNSON BUILDING

Dr. Charles Q. Lindsey, Superintendent

September 14, 2001

Brandi Percifield
JBC Box #760
Knoxville, TN 37998

Dear Ms. Percifield:

You are granted permission to contact appropriate building-level administrators concerning the conduct of your proposed research. In the Knox County schools final approval of any research study is contingent upon acceptance by the principal(s) at the site(s) where the study will be conducted. Include a copy of this permission form when seeking approval from the principal(s).

In all research studies names of individuals, groups, or schools may not appear in the text of the study unless *specific* permission has been granted through this office. The principal researcher is required to furnish this office with one copy of the completed research document.

Good luck with your study. Do not hesitate to contact me if you need further assistance or clarification.

Yours truly,

Mike S. Winstead, Ph.D.
Coordinator of Research and Evaluation
Phone: (865) 594-1740
Fax: (865) 594-1709

Project No. 111

P.O. Box 2188 • 912 South Gay Street • Knoxville, Tennessee 37901-2188 • Telephone (865) 594-1800

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APPENDIX B

Date: 12/10/01

Dear Parent(s),

My year in third grade is progressing very well. I enjoy learning more about your children and how they learn everyday. As an intern this year, I am required to complete research in the classroom. Mrs. Johnson and Mrs. Andrews have given permission for me to focus on peer collaboration in small groups effect the test scores in math.

The class will be divided into two groups. One half will work on the assignment independently while the other half work in groups. The two groups will switch places half way through the project so every child has the opportunity to work in a small group. At the end of each unit, a post-test will be given.

While your children will participate in the activities, I need parental permission to use their scores in my research project. No student name will appear in the research data. I greatly appreciate your cooperation in this matter.

Please fill out the bottom portion of this letter and return it by Date: December 20. If you have any questions, please feel free to call me at school during the day. Thank you so much for your support this year.

Sincerely,

Brandi Percifield

_____Miss Percifield has permission to use my child's scores in the research project.

_____Miss Percifield does not have permission to use my child's scores in the project.

_____ _____

Child's name Parent's Signature

SE046944

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